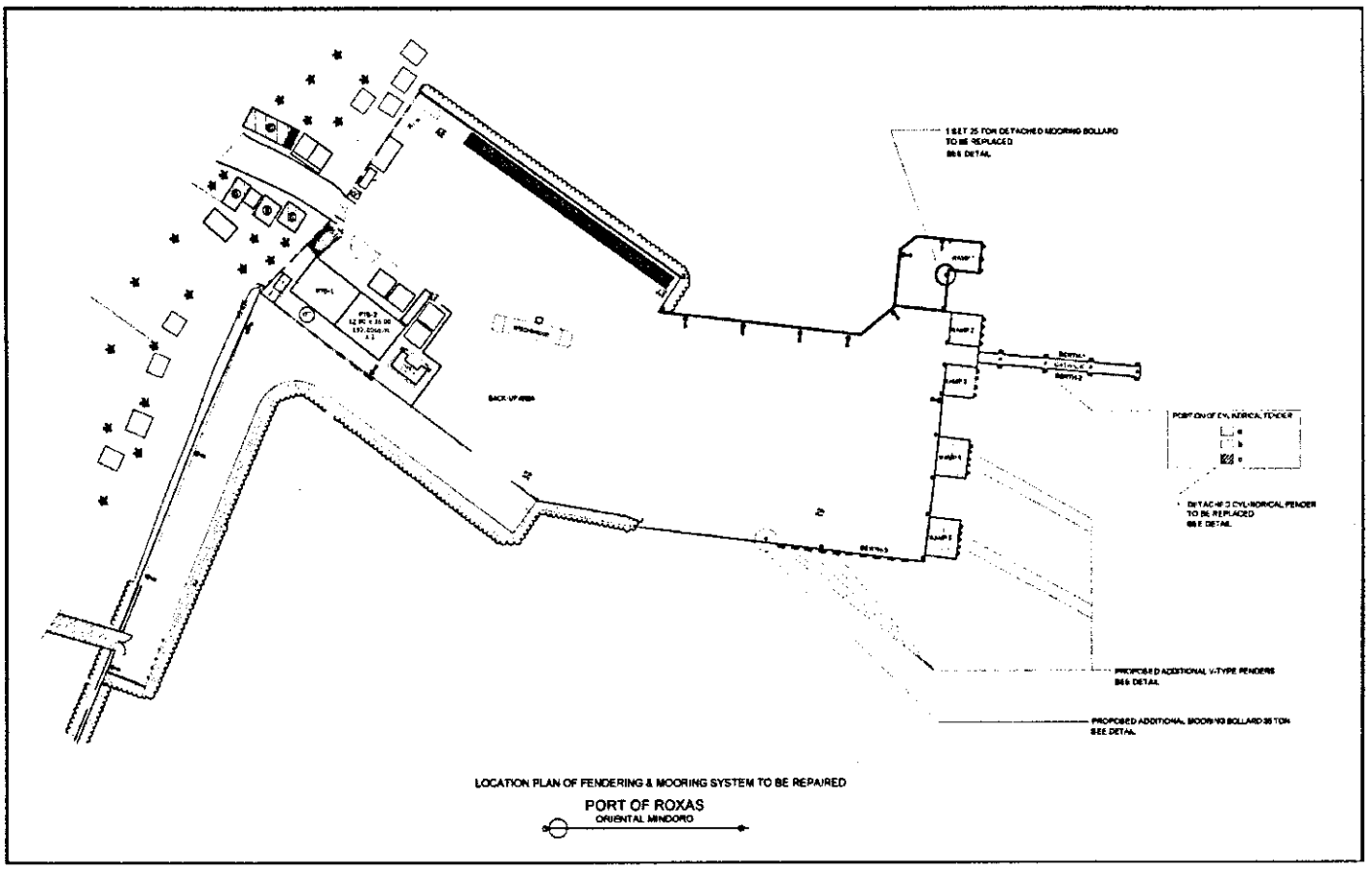
BAGONG PILIPINAS

PHILIPPINE PORTS AUTHORITY

RESTORATION OF RORO RAMP NO. 1 AND FENDERING SYSTEM

PORT OF ROXAS
ORIENTAL MINDORO
(HO-RM-INFRA-AGME-25-025)



BID DOCUMENTS
SEPTEMBER 2025

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GLOSSARY OF TERMS, ABBREVIATIONS, AND ACRONYMS

Glossary of Terms, Abbreviations, and Acronyms

ABC – Approved Budget for the Contract.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender.* (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

Contractor – is a natural or juridical entity whose proposal was accepted by the Procuring Entity and to whom the Contract to execute the Work was awarded. Contractor as used in these Bidding Documents may likewise refer to a supplier, distributor, manufacturer, or consultant.

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

Foreign-funded Procurement or Foreign-Assisted Project – Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as

specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods – Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term "related" or "analogous services" shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board.

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

UN – United Nations.

SECTION I

INVITATION TO BID

BAGONG PILIPINAS

PHILIPPINE PORTS AUTHORITY

INVITATION TO BID

FOR THE

RESTORATION OF RORO RAMP NO. 1 AND FENDERING SYSTEM, PORT OF ROXAS, ORIENTAL MINDORO

The Philippine Ports Authority, through the Corporate Budget of the Authority for CY 2025, intends to apply the sum of **P10,573,186.33** being the Approved Budget for the Contract (ABC) to payments under the contract for the **RESTORATION OF RORO RAMP NO. 1 AND FENDERING SYSTEM, PORT OF ROXAS, ORIENTAL MINDORO (HO-RM-INFRA-AGME-25-025)**. Bids received in excess of the ABC shall be automatically rejected at bid opening.

The Philippine Ports Authority now invites bids for the above Procurement Project. Completion of the Works is required in **Sixty (60) calendar days** from the receipt by the successful bidder of the Notice to Proceed. Bidders should have completed a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II (Instructions to Bidders).

Bidding will be conducted through open competitive bidding procedures using a non-discretionary "pass/fail" criterion as specified in the 2016 Revised Implementing Rules and Regulations (IRR) of Republic Act (RA) 9184.

Interested bidders may obtain further information from the Philippine Ports Authority Bids and Awards Committee (BAC) and inspect the Bidding Documents at the address given below from 8:00 a.m. to 5:00 p.m., Monday to Friday.

A complete set of Bidding Documents may be acquired by interested Bidders on **10 September 2025** from the given address and website(s) below and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of **TWENTY FIVE THOUSAND PESOS (P25,000.00).** The Procuring Entity shall allow the bidder to present its proof of payment for the fees in person.

The Philippine Ports Authority's Bids and Awards Committee will hold a Pre-Bid Conference on **18 September 2025 at 3:00 p.m.** at the PPA Function Room, 7th Floor, PPA Bldg., Bonifacio Drive, South Harbor, Port Area, Manila, which shall be open to all prospective bidders.

Bids must be duly received by the BAC Secretariat through manual submission at the office address indicated below on or before **02 October 2025 at 8:00 a.m.** Late bids shall not be accepted.

All bids must be accompanied by a bid security in any of the acceptable forms and in amount stated in ITB Clause 16.

Bid opening shall be on **02 October 2025 at 9:00 a.m.** at the 7th Floor, PPA Building, A. Bonifacio Drive, South Harbor, Port Area, Manila. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

The Philippine Ports Authority reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised Implementing Rules and Regulations of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.

- Required PCAB Registration: **SMALL B - Port, Harbor and Offshore Engineering**

For further information, please refer to:

BAC Secretariat, Philippine Ports Authority
5th Floor, PPA Bldg., A. Bonifacio Drive,
South Harbor, Port Area, Manila
Telephone Nos. 527-47-35
527-83-56 to 83 loc. 539
PPA Website: www.ppa.com.ph
PhilGEPS Website: www.philgeps.gov.ph

MARK JON S. PALOMAR
Chairperson, PPA Head Office Bids and Awards
Committee for Engineering Projects (HO-BAC-EP)

SECTION II

INSTRUCTIONS TO BIDDERS

1. Scope of Bid

The Procuring Entity, ***Philippine Ports Authority,*** invites Bids for the ***Restoration of Roro Ramp No.1 and Fendering System, Port of Roxas, Oriental Mindoro,*** with Project Identification Number: *HO-RM-INFRA-AGME-25-025.*

The ***Restoration of Roro Ramp No.1 and Fendering System, Port of Calapan, Oriental Mindoro,*** is for the construction of Works, as described in Section VI (Specifications).

2. Funding Information

2.1. The ***Philippine Ports Authority,*** through the source of funding as indicated below, for ***CY2025*** in the amount of ***₱ 10,573,186.33***.

2.2. The source of funding is:

PPA Corporate Fund.

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manual and associated policies, rules, and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or invitation to bid by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have inspected the site, determined the general characteristics of the contracted Works and the conditions for this Project, such as the location and the nature of the work; (b) climatic conditions; (c) transportation facilities; (c) nature and condition of the terrain, geological conditions at the site communication facilities, requirements, location and availability of construction aggregates and other materials, labor, water, electric power and access roads; and (d) other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

5.1 Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.

5.2 The Bidder must have an experience of having completed a Single Largest Completed Contract (SLCC) that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC adjusted, if necessary, by the Bidder to current prices using the PSA's CPI, except under conditions provided for in Section 23.4.2.4 of the 2016 revised IRR of RA No. 9184.

A contract is considered to be "similar" to the contract to be bid if it has the major categories of work stated in the **BDS**.

5.3. For Foreign-funded Procurement, the Procuring Entity and the foreign government/foreign or international financing institution may agree on another track record requirement, as specified in the Bidding Document prepared for this purpose.

5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

6. Origin of Associated Goods

There is no restriction on the origin of Goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN.

7. Subcontracts

7.1. The Bidder may subcontract portions of the Project to the extent allowed by the Procuring Entity as stated herein, but in no case more than fifty percent (50%) of the Project.

The Procuring Entity has prescribed that:

Subcontracting is not allowed.

7.2. Subcontracting of any portion of the Project does not relieve the Contractor of any liability or obligation under the Contract. The Supplier will be responsible for the acts, defaults, and negligence of any subcontractor, its agents, servants, or workmen as fully as if these were the Contractor's own acts, defaults, or negligence, or those of its agents, servants, or workmen.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address and/or through videoconferencing/webcasting as indicated in paragraph 6 of the **IB.**

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address and/or through videoconferencing/webcasting as indicated in paragraph 6 of the **IB.**

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents Comprising the Bid: Eligibility and Technical Components

10.1 The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section IX. Checklist of Technical and Financial Documents.**

10.2 If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. For Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

10.3 A valid PCAB License is required, and in case of joint ventures, a valid special PCAB License, and registration for the type and cost of the contract for this Project. Any additional type of Contractor license or permit shall be indicated in the **BDS**.

10.4 A List of Contractor's key personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen) assigned to the contract to be bid, with their complete qualification and experience data shall be provided. These key personnel must meet the required minimum years of experience set in the **BDS**.

10.5 A List of Contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership, certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be, must meet the minimum requirements for the contract set in the **BDS**.

11. Documents Comprising the Bid: Financial Component

11.1. The second bid envelope shall contain the financial documents for the Bid as specified in Section **IX. Checklist of Technical and Financial Documents**.

11.3. For Foreign-funded procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Alternative Bids

Bidders shall submit offers that comply with the requirements of the Bidding Documents, including the basic technical design as indicated in the drawings and specifications. Unless there is a value engineering clause in the BDS, alternative Bids shall not be accepted.

13. Bid Prices

All bid prices for the given scope of work in the Project as awarded shall be considered as fixed prices, and therefore not subject to price escalation during contract implementation, except under extraordinary circumstances as determined by the NEDA and approved by the GPPB pursuant to the revised Guidelines for Contract Price Escalation guidelines.

14. Bid and Payment Currencies

14.1. Bid prices may be quoted in the local currency or tradeable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.

14.2. *Payment of the contract price shall be made in:*

Philippine Pesos.

15. Bid Security

15.1. The Bidder shall submit a Bid Securing Declaration or any form of Bid Security in the amount indicated in the BDS, which shall be not less than the percentage of the ABC in accordance with the schedule in the BDS.

15.2. The Bid and bid security shall be valid until **One Hundred Twenty (120) days from the date set for Bid Opening**. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

Each Bidder shall submit one copy of the first and second components of its Bid.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission to the given website or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

17. Deadline for Submission of Bids

The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB**.

18. Opening and Preliminary Examination of Bids

18.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

18.2. The preliminary examination of Bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

19.1. The Procuring Entity's BAC shall immediately conduct a detailed evaluation of all Bids rated "passed" using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of 2016 revised IRR of RA No. 9184.

19.2. If the Project allows partial bids, all Bids and combinations of Bids as indicated in the **BDS** shall be received by the same deadline and opened and evaluated simultaneously so as to determine the Bid or combination of Bids offering the lowest calculated cost to the Procuring Entity. Bid Security as required by **ITB** Clause 16 shall be submitted for each contract (lot) separately.

19.3 In all cases, the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184 must be sufficient for the total of the ABCs for all the lots participated in by the prospective Bidder.

20. Post Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS), and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.

SECTION III

BID DATA SHEET

Bid Data Sheet

<table>
<tr><td>ITB Clause</td><td colspan="3"></td></tr>
<tr><td>5.2</td><td colspan="3">For this purpose, contracts similar to the Project refer to contracts which have the same Major Categories of Works which shall be:</td></tr>
<tr><td></td><td>Description/Clarification</td><td>Unit of Measure</td><td>Quantity (at least)</td></tr>
<tr><td></td><td>1. Reinforced Concrete Works for Superstructures</td><td>Cu.m</td><td>20</td></tr>
<tr><td>7.1</td><td>Portion of Works allowed to be subcontracted:

Subcontracting is not allowed</td><td colspan="2">Maximum Percentage allowed to be subcontracted:

Subcontracting is not allowed</td></tr>
<tr><td>10.3</td><td colspan="3">For Joint Venture:

Special PCAB License</td></tr>
<tr><td>10.4</td><td colspan="3">The key personnel must meet the required minimum years of experience set below:</td></tr>
<tr><td></td><td>Key Personnel</td><td>General Experience</td><td>Relevant Experience (Minimum)</td></tr>
<tr><td></td><td>a. Project Manager

b. Project Engineer

c. Materials Engineer I

d. Construction Safety and Health Officer

e. Foreman</td><td></td><td>Five (5) years

Three (3) years

One (1) year

One (1) year

Five (5) years</td></tr>
</table>

10.5	*The minimum major equipment requirements are the following:* **Please refer to Section 8, *Annex 3 Minimum Major Equipment Requirements***
12	*Value Engineering Clause:* **Not Allowed**
15.1	The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts: a. The amount of not less than **₱ 211,463.726,** if bid security is in cash, cashier's/manager's check, bank draft/guarantee, or irrevocable letter of credit; b. The amount of not less than **₱ 528,659.316**, if bid security is in Surety Bond.
16	Each bidder shall submit one (1) original and six (6) copies of the Technical and Financial Proposals, properly labelled, book-bound, with hard cover and corresponding index tabs. Failure to comply with the requirements is a ground for the automatic disqualification of the bidder.
19.2	Partial bids: **Not Allowed**
20	*Other appropriate licenses and permits required:* **None**
21	*Other contract documents are as follows:* *Construction Schedule and S-Curve, Manpower Schedule, Construction Methods, Equipment Utilization Schedule, Construction Safety and Health Program approved by the Department of Labor and Employment and PERT/CPM or other acceptable tools of project scheduling.*

SECTION IV

GENERAL CONDITIONS OF CONTRACT

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

2. Sectional Completion of Works

If sectional completion is specified in the **Special Conditions of Contract (SCC)**, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date shall apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

3. Possession of Site

4.1. The Procuring Entity shall give possession of all or parts of the Site to the Contractor based on the schedule of delivery indicated in the **SCC**, which corresponds to the execution of the Works. If the Contractor suffers delay or incurs cost from failure on the part of the Procuring Entity to give possession in accordance with the terms of this clause, the Procuring Entity's Representative shall give the Contractor a Contract Time Extension and certify such sum as fair to cover the cost incurred, which sum shall be paid by Procuring Entity.

4.2. If possession of a portion is not given by the above date, the Procuring Entity will be deemed to have delayed the start of the relevant activities. The resulting adjustments in contract time to address such delay may be addressed through contract extension provided under Annex "E" of the 2016 revised IRR of RA No. 9184.

4. The Contractor's Obligations

The Contractor shall employ the key personnel named in the Schedule of Key Personnel indicating their designation, in accordance with **ITB** Clause 10.3 and specified in the **BDS**, to carry out the supervision of the Works.

The Procuring Entity will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are equal to or better than those of the personnel listed in the Schedule.

5. Performance Security

5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.

5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the **SCC** supplemented by any information obtained by the Contractor.

7. Warranty

7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.

7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the **SCC**.

8. Liability of the Contractor

Subject to additional provisions, if any, set forth in the **SCC**, the Contractor's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Contractor is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

9. Termination for Other Causes

Contract termination shall be initiated in case it is determined prima facie by the Procuring Entity that the Contractor has engaged, before, or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation, such as, but not limited to corrupt, fraudulent, collusive, coercive, and obstructive practices as stated in **ITB** Clause 4.

10. Dayworks

Subject to the guidelines on Variation Order in Annex "E" of the 2016 revised IRR of RA No. 9184, and if applicable as indicated in the SCC, the Dayworks rates in the Contractor's Bid shall be used for small additional amounts of work only when the Procuring Entity's Representative has given written instructions in advance for additional work to be paid for in that way.

11. Program of Work

11.1. The Contractor shall submit to the Procuring Entity's Representative for approval the said Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works. The submissions of the Program of Work are indicated in the **SCC.**

11.2. The Contractor shall submit to the Procuring Entity's Representative for approval an updated Program of Work at intervals no longer than the period stated in the **SCC.** If the Contractor does not submit an updated Program of Work within this period, the Procuring Entity's Representative may withhold the amount stated in the **SCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program of Work has been submitted.

12. Instructions, Inspections and Audits

The Contractor shall permit the GOP or the Procuring Entity to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors of the GOP or the Procuring Entity, as may be required.

13. Advance Payment

The Procuring Entity shall, upon a written request of the Contractor which shall be submitted as a Contract document, make an advance payment to the Contractor in an amount not exceeding fifteen percent (15%) of the total contract price, to be made in lump sum, or at the most two installments according to a schedule specified in the **SCC**, subject to the requirements in Annex "E" of the 2016 revised IRR of RA No. 9184.

14. Progress Payments

The Contractor may submit a request for payment for Work accomplished. Such requests for payment shall be verified and certified by the Procuring Entity's Representative/Project Engineer. Except as otherwise stipulated in the **SCC**, materials and equipment delivered on the site but not completely put in place shall not be included for payment.

15. Operating and Maintenance Manuals

15.1. If required, the Contractor will provide "as built" Drawings and/or operating and maintenance manuals as specified in the **SCC.**

15.2. If the Contractor does not provide the Drawings and/or manuals by the dates stated above, or they do not receive the Procuring Entity's Representative's approval, the Procuring Entity's Representative may withhold the amount stated in the **SCC** from payments due to the Contractor.

SECTION V

SPECIAL CONDITIONS OF CONTRACT

Special Conditions of Contract

GCC Clause	
2	*Sectional Completion:* **None**
4.1	The Procuring Entity shall give possession of all parts of the Site to the Contractor upon commencement of the project.
6	*Site Investigation Report:* **None**
7.2	*Permanent structures: Fifteen (15) years* Buildings of types 4 and 5 as classified under the National Building Code of the Philippines and other structures made of steel, iron, or concrete which comply with relevant structural codes (e.g., DPWH Standard Specifications), such as, but not limited to, steel/concrete bridges, flyovers, aircraft movement areas, ports, dams, tunnels, filtration and treatment plants, sewerage systems, power plants, transmission and communication towers, railway system, and other similar permanent structures
10	No dayworks are applicable to the contract.
11.1	The Contractor shall submit the Program of Work to the Procuring Entity's Representative within ____ days of delivery of the Notice of Award.
11.2	The amount to be withheld for late submission of an updated Program of Work is _____.
13	The provision on advance payments or mobilization fees in the terms and conditions of all contracts/ purchase orders/ job orders for goods, services and infrastructure projects that will be signed or executed shall henceforth be excluded.
14	No further instructions.
15.1	The date by which operating and maintenance manuals are required is _____. The date by which "as built" drawings are required is _____.
15.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required is _____.

SECTION VI

TECHNICAL SPECIFICATIONS

ITEM 1. 01 : MOBILIZATION, DEMOBILIZATION AND CLEANING UP

The Contractor shall mobilize and put into work all personnel, plant, and equipment required to undertake the works. The minimum equipment required to be mobilized at the site are the following:

Equipment Description	Quantity
Chipping Gun	8 units
One Bagger Concrete Mixer	2 units
Concrete Vibrator, 3.5hp	2 units
Boom Truck,5t	1 unit
Truck Mounted Crane,5t	1 unit
Bar Cutter	1 unit
Bar Bender	1 unit
Electric Grinder	2 units
Welding Machine	2 units
Electric Drill	2 units
Oxy-Acetelyne Cutting Outfit	4 units
Truck Mounted Crane 30t	1 unit
Dump Truck	1unit
Jackhammer w/ Compressor	4 units

ITEM 2. 01 : DEMOLITION AND DISPOSE DAMAGED RORO RAMP, BOLLARD BASE INCLUDING TURNOVER OF EXISTING V-TYPE RUBBER DOCK FENDER AND 25T MOORING BOLLARD

DESCRIPTION

The work includes the furnishing of all labor, materials and equipment required to carry out the demolition and removal of old structures, port accessories and obstructions including demolition of miscellaneous, etc. as required for the execution of the Contract.

The Contractor shall submit the proposed methodology or procedure of demolition work with detailed drawings and calculations if necessary, to the Engineer for approval, before the execution of the Works.

The Contractor shall keep all pavements and landing areas to and from the site of the disposal area clean and free of mud, dirt and debris during and after the execution of disposal. Disposal of debris and materials shall be as directed by the Engineer.

GENERAL PROVISIONS

1. The Contractor shall be deemed to have satisfied himself of the site conditions, and to have included in his unit prices provision for all risks that may arise during or in connection with the work.

2. The demolition shall be carried out by approved methods and equipment such as chipping gun, etc., however, no blasting shall be used unless approved in writing by the Engineer and after obtaining the written permission of the concerned authorities.

3. The Contractor shall provide suitable equipment, skilled labor and appropriate temporary works such as safety barricade to ensure safety in his demolition works as well as in the adjacent area.

4. Contractor shall demolish all the structural members above the level on which the subsequent and permanent works under this Contract will begin. To this end, the temporary construction works such as excavation shall be conducted by the Contractor.

5. Materials coming from the demolition works, except general earth, shall remain the property of the Procuring Entity, the designated part of which shall be stored by the Contractor at places specified by the Engineer/ Accepting authority. Receiving copy of Turn-Over Report shall be provided.

6. In case of demolition of wharf deck and platform, the contractor shall ensure that no debris will be remained/deposited at seabed.

INTERFERENCE WITH PORT OPERATIONS

During the execution of the work, the Contractor shall not interfere with the shipping, navigation and other traffic in the port.

The Contractor shall make arrangements with the operations people on the schedule of demolition and related works to keep port operation activities undisturbed at all times.

Prior to commencement of the demolition works, the Contractor shall inform/announce to port users the schedule of disconnection of utilities.

STORAGE AND DUMPING

Prior to the commencement of the demolition work, the Engineer shall submit to the Contractor a list in which all the materials to be salvaged and overhauled, as property of PPA, and the description of the location of their storage. Materials embedded in concrete units shall not be salvaged.

The Contractor shall separate materials to be salvaged from debris. Salvaged materials shall be loaded, transported and unloaded by the Contractor at the specified locations.

The Contractor may dump debris or extracted concrete on land areas but out of the site, which areas shall be procured and prepared at his own expense. In this case, safety measures shall be undertaken in the transporting, unloading, covering and others as requested by the Engineer.

The approximate distance of the disposal site from the project site is about five (5) kms., as designated by the PMO thru the implementing office.

EXECUTION

1. Prior to the commencement of demolition works, the alignments of the new construction works to existing structure shall be checked.

2. The width and alignment of portion of existing structure to be demolished shall be marked by paint.

3. With these lines as guides, concrete shall be broken and reinforcing bars cut, such that panels or portions of the structure can be lifted out for disposal elsewhere outside of the operational work area.

4. Demolish ramp deck, utilities, services, navigation aids and the likes as determined in the field for each project and as shown on the drawings or as directed by the Engineer.

5. Materials coming from the demolition works shall be properly disposed by the Contractor.

SAFETY

During the course of survey and clearing, any obstacles which are recognized and seemed to be explosive or hazardous to workers shall be removed from the site by the proper Authority.

At the end of each day's work, the Contractor shall keep the workplace in safe condition and clean so that no part is in danger of falling or creating hazard to personnel or equipment.

ITEM 2.02 : CHIPPING OF BEAM CONCRETE

Scope of Work

The work includes the furnishing of all labor and equipments required to carry out the demolition / chipping-off of existing concrete beam as shown on the Drawings and as instructed by the PPA Engineer.
Waste materials shall be hauled and dumped in the area designated by the engineer/PPA representative while salvaged materials shall be turned over to the Authority.

ITEM 2.03 : REINFORCED CONCRETE

SCOPE OF WORK

The work shall include reinforced concrete structures such as reinforced concrete footings with or without tie-beams, reinforced concrete columns girders, slabs, other cast-in-place and precast concrete including excavation and backfilling work. The work shall consist of furnishing of all labor, materials, equipment and other incidentals necessary for the supply of concrete materials and the complete construction of the concrete structures for the building shown on the drawings in accordance with these specifications and as directed by the Engineer.

GENERAL PROVISIONS

Full cooperation shall be given to the other trades to install embedded items.

Suitable templates or instructions will be provided for setting, items shall have been inspected, and tests for concrete or other materials or for mechanical operations shall have been completed and approved.

The following publications of the issues listed below, but referred to thereafter by
basic designation only, form as an integral part of this Specification to the extent
indicated by the reference thereto:

1. American Concrete Institute (ACI) Standards:
   - ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials
   - ACI 121R Quality Management System for Concrete Construction
   - ACI 201.2R Guide to Durable Concrete
   - ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
   - ACI 214R Recommended Practice for Evaluation of Strength Test Results of Concrete
   - ACI 301 Specifications for Structural Concrete
   - ACI 304.2R Placing Concrete by Pumping Methods
   - ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete
   - ACI 305R Hot Weather Concreting
   - ACI 306.1 Standard Specification for Cold Weather Concreting
   - ACI 308R Guide to Curing Concrete
   - ACI 309R Guide for Consolidation of Concrete
   - ACI 311.4R Guide for Concrete Inspection

ACI 318M	Metric Building Code Requirements for Structural Concrete and Commentary
ACI 347	Guide to Formwork for Concrete
ACI SP-15	Field Reference Manual: Standard Specifications for Structural Concrete with Selected ACI and ASTM References
ACI SP-2	ACI Manual of Concrete Inspection

2. American Society for Testing and Materials (ASTM) Publications:

ASTM A 185	Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A 496	Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
ASTM A 497	Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete
ASTM A 615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 82	Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A 934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A 966	Standard Test Method for Magnetic Particle Examination of Steel Forgings Using Alternating Current
ASTM C 1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C 1064	Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C 1077	Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1107	Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
ASTM C 1157	Standard Specification for Hydraulic Cement
ASTM C 1202	Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
ASTM C 1218	Standard Specification for Water-Soluble Chloride in Mortar and Concrete
ASTM C 1240	Standard Specification for Silica Fume Used in Cementitious Mixtures

ASTM C 1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C 131	Test Method for Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 127	Test Method for Specific Gravity and Absorption of Coarse Aggregate
ASTM C 138	Standard Test Method for Density ("Unit Weight"), Yield, and Air Content (Gravimetric) of Concrete
ASTM C 143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C 150	Standard Specification for Portland Cement
ASTM C 171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C 172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C 173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 192	Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 227	Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
ASTM C 231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C 295	Petrographic Examination of Aggregates for Concrete
ASTM C 309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 33	Standard Specification for Concrete Aggregates
ASTM C 39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 42	Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 441	Effectiveness of Pozzolans or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete Due to the Alkali-Silica Reaction
ASTM C 469	Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
ASTM C 494	Standard Specification for Chemical Admixtures for Concrete

ASTM C 496	Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C 595	Standard Specification for Blended Hydraulic Cements
ASTM C 597	Pulse Velocity Through Concrete
ASTM C 618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C 642	Density, Absorption, and Voids in Hardened Concrete
ASTM C 805	Rebound Number of Hardened Concrete
ASTM C 881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 920	Standard Specification for Elastomeric Joint Sealants
ASTM C 94	Standard Specification for Ready-Mixed Concrete
ASTM C 989	Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
ASTM C 1751	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction. (Non-extruding and Resilient Bituminous Types).
ASTM D 1179	Fluoride Ion in Water
ASTM D 1190	Standard Specification for Concrete Joint Sealer, Hot-Applied Elastic Type
ASTM D 1339	Sulfite Ion in Water
ASTM D 1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
ASTM D 1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Nitrite-Nitrate in Water
ASTM D 3867	Nitrite-Nitrate in Water
ASTM D 512	Chloride Ion in Water
ASTM D 516	Sulfate Ion in Water
ASTM E 329	Standard Specification for Agencies Engaged in the Testing and/ or Inspection of Materials Used in Construction

3. American Welding Society (AWS)

D 12	Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

4. All other standards hereinafter indicated
   The edition or the revised version of such codes and standards current at the date twenty eight (28) days prior to date of bid submission shall apply. During Contract execution, any changes in such codes and standards shall be applied after approval by the Owner.

SUBMITTALS

1. Submit Test Reports for the following:

   (a) Concrete mixture proportions

   Submit copies of test reports by independent test labs conforming to ASTM C 1077 showing that the mixture has been successfully tested to produce concrete with the properties specified and that mixture will be suitable for the job conditions. Test reports shall be submitted along with the concrete mixture proportions. Obtain approval before concrete placement. Fully describe the processes and methodology whereby mixture proportions were developed and tested and how proportions will be adjusted during progress of the work to achieve, as closely as possible, the designated levels of relevant properties.

   (b) Aggregates

   Submit test results for aggregate quality in accordance with ASTM C 33. Where there is potential for alkali-silica reaction, provide results of tests conducted in accordance with ASTM C 227 or ASTM C 1260. Submit results of all tests during progress of the work in tabular and graphical form as noted above, describing the cumulative combined aggregate grading and the percent of the combined aggregate retained on each sieve.

   (c) Admixtures (if required to be used by field conditions subject to approval by the Design Engineer)

   Submit test results in accordance with ASTM C 494 and ASTM C 1017 for concrete admixtures, ASTM C 260 for air-entraining agent, and manufacturer's literature and test reports for corrosion inhibitor and anti-washout admixture. Submitted data shall be based upon tests
   performed within 6 months of submittal.

(d) Cement

Submit test results in accordance with ASTM C 150 Portland cement
and/or ASTM C 595 and ASTM C 1157 for blended cement. Submit current mil data.

(e) Water

Submit test results in accordance with ASTM D 512 and ASTM D 516.

(f) Reinforcement and Protective Coating

Provide coating manufacturer's and coating applicator's test data sheets certifying that applied coating meets the requirements of ASTM
A 934.

2. Submit Certificates for the following:

(a) Curing concrete element

3. Submit proposed materials and methods for curing concrete elements.

(a) Form removal schedule

4. Submit proposed materials and methods for curing concrete elements.

(a) Concrete placement and compaction
   (i) Submit technical literature for equipment and methods proposed for use in placing concrete. Include pumping or conveying equipment including type, size and material for pipe, valve characteristics, and the maximum length and height concrete will be pumped. No adjustments shall be made to the mixture design to facilitate pumping.
   (ii) Submit technical literature for equipment and methods proposed for vibrating and compacting concrete. Submittal shall include technical literature describing the equipment including vibrator diameter, length, frequency, amplitude, centrifugal force, and manufacturer's description of the radius of influence under load. Where flat work is to be cast, provide similar information relative to the proposed compacting screed or other method to ensure dense placement.

(b) Mixture designs
Provide a detailed report of materials and methods used, test results,
and the field test strength (fcr) for marine concrete required to meet durability requirements.

(c) The Contractor shall submit shop drawings and erection drawings for formwork and scaffolding at least 14 days prior to commencing the work. Each shop drawing and erection drawing shall bear the signature of a Contractor's qualified Engineer. Details of all proposed formwork to be prefabricated and formwork to produce special finishes shall be submitted to the Engineer for approval before any materials are ordered. If the Engineer so requires, samples of proposed formworks shall be constructed and concrete placed at the Contractor's expense so that the proposed methods and finished effect can be demonstrated. The Contractor shall submit shop drawings showing reinforcing bar placing and bar lists for the Engineer's approval. Such shop drawings shall show also supplemental bars for forming, strengthening frames of bars of sufficient rigidity to withstand forces during placing concrete. If necessary, shaped steel may be added to improve rigidity of the frame of bar. Such shop drawings shall clearly indicate bar sizes, spacing, location and quantities of reinforcement, mesh, chairs, spacers and other details to be as per ACI Manual of Standard Practice for Detailing Reinforced Concrete Structures. Details shall be prepared for placement of reinforcement where special conditions occur, including most congested areas and connection between precast concrete and concrete in-situ. All shop drawings shall be reviewed by the Engineer within seven (7) days after receiving them. At least two (2) days prior to pouring concrete, the Contractor shall submit to the Engineer a pouring permit for his inspection and approval.

(d) Field Samples

1. Slab Finish Sample
   Install minimum of 3m x 3m slab. Finish as required by Specification.
2. Underwater Concrete Sample
   Place concrete in four 5 gallon buckets below water. Permanently mark as "7 days," "14 days," "28 days," and "Extra." Include date and station. Provide specimen sets at every 46 lineal meter of seawall with a minimum of one set per day of underwater concrete placement. Retrieve

specimens at specified intervals. Extract 100 mm diameter by 250 mm core and test in accordance with ASTM C 39.

MATERIAL REQUIREMENTS

1. Cement

   Unless otherwise specified in the Drawings, only one (1) brand of cement shall be used for any individual structure. In determining the approved mix, only Portland cement shall be used as the cementitious material.

   (a) Portland Cement: Use ASTM C 150, Type II for general use in construction, more especially when moderate Sulfate resistance is desired.

   (b) High-Early Strength Portland Cement may be used for precast concrete. Cement Type III shall conform to ASTM C 150 with a tricalcium aluminate limited to 8 percent.

2. Admixture (If Necessary)

   Unless otherwise required by field conditions, admixture may be used subject to the expressed approval of the Engineer. The cost of which shall already be included in the unit cost bid of the Contractor for the concrete.

   (a) Air Entraining Admixture shall conform to ASTM C 260.

   (b) Admixture other than air entraining agent shall conform to ASTM C 494.

   (c) Admixture containing chloride ions, or other ions producing deleterious effect shall not be used.

3. Aggregates

   (a) Crushed Coarse Aggregate

   Conforming to ASTM C 33 and having nominal sizes passing 38.0 mm to 19.0 mm, 19.0 mm to 9.5 mm to No. 4 sieve. The material shall be well graded between the limits indicated and individually stockpiled. It shall be the Contractor's responsibility to blend the materials to meet the gradation requirements for various types of concrete as specified herein. Nominal sizes for combined gradation shall be as follows:

ASTM Sieves	Nominal Size of Coarse Aggregates % by Weight Passing			
	40 mm	25 mm	19 mm	10 mm
50.0 mm (2")	100	-	-	-
38.0 mm (1 ½")	95-100	100	-	-
31.8 mm (1 ¼")	-	90-100	100	-
25.0 mm (1")	-	-	90-100	-
19.0 mm (3/4")	35-70	25-90	-	100
16.0 mm (5/8")	-	-	20-55	85-100
9.5 mm (3/8")	10-30	0-10	0-10	0-20
No. 4	0-5			

(b) Fine Aggregate

ASTM C 33 except for gradation which has been revised to meet local

conditions unless otherwise required by the Engineer, grading of find aggregate shall be as follows:

ASTM Sieves	% by Weight Passing
9.5 mm (3/8")	100
No. 4	90 - 100
No. 8	80 - 100
No. 16	50 - 90
No. 30	25 - 60
No. 50	10 - 30
No. 100	2 - 10

(i) Grading of fine aggregates shall be reasonably uniform and fineness modulus thereof shall not vary more than 0.2 from that of the representative sample in which mix proportions of concrete are based.

(ii) Due care shall be taken to prevent segregation.

4. Water

The water used in concrete, mortar and grout shall be free from objectionable quantities of silt, organic matter, alkali, salts and other impurities. Sea water shall not be used at any time.

5. Anchorage Items

Dowels for anchoring mechanical items to concrete shall be in conformity to manufacturer's standard and of types required to engage with the anchors to be provided and installed therein under other sections of these Specifications, and shall be subject to the approval of the Engineer.

6. Curing Materials

a. Impervious Sheet Materials: ASTM C 171 type, optional, except that polyethylene film, if used, shall be white opaque.

b. Burlap of commercial quality, non-staining type, consisting of 2 layers minimum.
c. Membrane Forming Curing Compound: ASTM C 309; submit evidence that product conforms to specifications.

7. Jointing Materials

a. Sealant: Sealant shall be multi-component, polyurethane base compound, gray in color, self-leveling for horizontal joints, 2 part polythremdyne, terpolymer compound, gray in color; non-sag for vertical joints.

Sealant shall be compatible with materials in contact and to perform satisfactorily under salt water and traffic conditions, and be capable of making joint watertight and allow movement 25% of the width of joint in any direction. Sealant shall be guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion for a period of five years from the date of acceptance of work.

b. Joint backing shall be expanded extruded polyethylene, low density, oval in shape to fit the joints as indicated on the drawings and to be compatible with sealant.

c. Where required, primer shall be compatible with joint materials and installed in accordance with manufacturer's instructions.

d. Joint filler shall conform to ASTM D1751 (AASHTO M213) non-extruding, resilient bituminous type. Filler shall be furnished for each joint in single piece for depth and width required for joint, unless otherwise authorized by the Engineer. When more than one piece is authorized for a joint, abutting ends shall be fastened and hold securely to shape by stapling or other positive fastening.

8. Epoxy Bonding Compound

ASTM C 881. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete. Provide Class B if placement temperature is

between 4 and 16°C; or Class C if placement temperature is above 16°C.

9. Neoprene Bearing Pad

Neoprene bearing pad shall be of 60 Durometer Hardness and of size as shown on drawings. It shall conform to AASHTO M 251.

10. Reinforcement

Steel reinforcement, other than Steel for Prestressing, used in Reinforced Concrete, shall conform to ASTM as follows:

- ASTM Designation A615-Deformed Billet Steel Bars for Concrete Reinforcement. Minimum yield strength of 275.8MPa (40,000 psi) for 12mmØ and smaller and 413.7MPa (60,000 psi) for diameter of 16 mmØ and larger.
- Welded steel wire ASTM Designation A185, Fabric for Reinforcement of Concrete.
- All bar reinforcement shall have deformed surfaces except that 6 mm bars may be plain.

11. Tie Wire

Tie wire shall be plain, cold drawn annealed steel wire 1.6 mm diameter.

SAMPLES AND TESTING

1. Cement: Sampled either at the mill or at the site of work and tested by an

independent commercial or government testing laboratory duly accredited by the Bureau of Research and Standards (BRS) of the DPWH, Department of Science and Technology (DOST) or the Department of Trade and Industry (DTI) at no additional cost to PFDA. Certified copies of laboratory test reports shall be furnished for each lot of cement and shall include all test data, results, and certificates that the sampling and testing procedures are in conformance with the Specifications. No cement shall be used until notice has been given by the Engineer that the test results are satisfactory. Cement that has been stored, other than in bins at the mills, for more than 3 months after delivery to the Site shall be re-tested before use. Cement delivered at the Site and later found after test to be unsuitable shall not be incorporated into the permanent works.

2. Aggregates: Tested as prescribed in ASTM C 33 At least 28 days prior to commencing the work, the Contractor shall inform the Engineer of the proposed source of aggregates and provide access for sampling. Gradation tests will be made on each sample without delay. All other aggregates tests required by these Specifications shall be made on the initial source samples, and shall be repeated whenever there is a change of source. The tests shall include an analysis of each grade of material and an analysis of the combined material representing the aggregate part of the mix.

3. Reinforcement: Certified copies of mill certificates shall accompany deliveries of steel bar reinforcement. If requested by the Engineer additional testing of the materials shall be made at the Contractor's expense.

4. Concrete Tests: For test purposes, provide three (3) sets of test specimens taken under the instruction of the Engineer from each 50 cu.m. or fraction thereof of each class of concrete placed. At least one (1) set of test specimen shall be provided for each class of concrete placed in each 8-hour shift. Each shall consist of two test specimens, and shall be made from a separate batch. Samples shall be secured in conformance with ASTM C 172. Tests specimens shall be made, cured, and packed for shipment in accordance with ASTM C 31. Cylinders will be tested by and at the expense of the Contractor in accordance with ASTM C 39. Test specimens will be evaluated separately by the Engineer, for meeting strength level requirements for each with concrete quality of ACI 318. The standard age of test shall be 28 days, but 7 day tests may be used, with the permission of the Engineer, provided that the relation between the 7-day and 28-day strengths of the concrete is established by tests for the materials and proportions used. When samples fail to conform to the requirements for strengths, the Engineer shall have the right to order a change in the proportions of the concrete mix for the remaining portions of the work at no additional cost to the Engineer.

5. Test of Hardened Concrete in or Removed from the Structure: When the results of the strength tests of the concrete specimens indicates the concrete as placed does not meet the Specification requirements or where there are other evidences that the quality of concrete is below the specification requirement in the opinion of the Engineer, tests on cores of in-place concrete shall be made in conformance with ASTM C 42. Core specimens shall be obtained by the Contractor and shall be tested. Any deficiency shall be corrected or if the Contractor elects, he

may submit a proposal for approval before the load test is made. If the proposal is approved, the load test shall be made by the Contractor and the test results evaluated by the Engineer in conformance with Chapter 20 of ACI 318. The cost of the load tests shall be borne by the Contractor. If any concrete shows evidence of failure during the load test, or fails the load test as evaluated, the deficiency be corrected in a manner approved by the Engineer at no additional cost to the Engineer.

6. Admixtures/Additives: The admixtures/additives if approved shall be tested for conformance to the referenced specification under which it is furnished. The testing shall be conducted with cement and aggregate proposed for the Project. The admixtures/additives shall be tested and those that have been in storage at the Project Site for longer than six (6) months shall not be used until proven by retest to be satisfactory. Five (5) liters of samples of any admixtures/additives proposed by the Contractor shall be submitted for testing at least 56 days in advance of use, which shall require approval of the Engineer. Testing of admixtures/additives proposed by the Contractor including test mixing and cylinder test shall be at the Contractor's expense.

7. Jointing Materials and Curing Compound Samples: At least 28 days prior to commencing the work, the Contractor shall submit to the Engineer for his approval samples of the following materials proposed for use together with manufacturer's certificate.
    i. 10 kg of joint sealant
    ii. 1 m length of joint filler
    iii. 5 liters of curing compound
    iv. 1 m length of joint backing

    The Engineer shall deliver to the Contractor his assessment on the materials within seven (7) days after receiving them.

FORMWORK

1. Forms: Designed, constructed, and maintained so as to insure that after removal of forms the finished concrete members will have true surfaces free of offset, waviness or bulges and will conform accurately to the indicated shapes, dimensions, lines, elevations and positions. Form surfaces that will be in contact with concrete shall be thoroughly cleaned before each use.

2. Design: Studs and wales shall be spaced to prevent deflection of form material. Forms and joints shall be sufficiently tight to prevent leakage

of grout and cement paste during placing of concrete. Juncture of formwork panels shall occur at vertical control joints, and construction joints. Forms placed on successive units for continuous surfaces shall be fitted in accurate alignment to assure smooth completed surfaces free from irregularities and signs of discontinuity. Temporary opening shall be arranged to wall and where otherwise required to facilitate cleaning and inspection. Forms shall be readily removable without impact, shock, or damage to the concrete.

3. Form Ties: Factory fabricated, adjustable to permit tightening of the forms, removable or snap-off metal of design that will not allow form deflection and will not spall concrete upon removal. Bolts and rods that are to be completely withdrawn shall be coated with a non-staining bond breaker. Ties shall be of the type which provide watertight concrete.

4. Chamfering: External corners that will be exposed shall be chamfered, beveled, or rounded by mouldings placed in the forms.

5. Coatings: Forms for exposed surfaces shall be coated with form oil or form release agent before reinforcement is placed. The coating shall be a commercial formulation of satisfactory and proven performance that will not bond with, stain, or adversely affect concrete surfaces, and shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds. The coating shall be used as recommended in the manufacturer's printed or written instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing of concrete. Surplus coating on form surfaces and coating on reinforcement steel and construction joints shall be removed before placing concrete.

6. Removal of Forms shall be done in a manner as to prevent injury to the concrete and to insure complete safety of the structure after the following conditions have been met. Where the structure as a whole is supported on shores, forms for beam and girder sides, and similar vertical structural members may be removed before expiration of curing period. Care shall be taken to avoid spalling the concrete surface or damaging concrete edges. Wood forms shall be completely removed.
   Minimum stripping and striking time shall be as follows unless otherwise approved by the Engineer.
   Vertical sides of beams, walls, and columns, lift not 12 hours exceeding 1.2 m
   Vertical sides of beams and walls, lift exceeding 1.2 m 36 hours

Softlifts of main slabs and beams (props left under) 5 days
Removal of props from beams and mains slabs and other work 10 days

7. Control Test: If the Contractor proposes to remove forms earlier than the period stated above, he shall be required to submit the results of control tests showing evidence that concrete has attained sufficient strength to permit removal of supporting forms. Cylinders required for control tests shall be provided in addition to those otherwise required by this Specification. Test specimens shall be removed from molds at the end of 24 hours and stored in the structure as near the points as practicable, the same protection from the elements during curing as is given to those portions of the structure which they represent, and shall not be removed from the structure for transmittal to the laboratory prior to expiration of three fourths of the proposed period before removal of forms. Cylinders will be tested by and at the expense of the Contractor. Supporting forms or shoring shall not be removed until control test specimens have attained
strength of at least 160 kg/sq cm. The newly unsupported portions of the
structure shall not be subjected to heavy construction or material loading.

REINFORCEMENT

1. Reinforcement: Fabricated to shapes and dimensions shown and shall beplaced where indicated. Reinforcement shall be free of loose or flaky rust and mill scale, or coating, and any other substance that would reduce or destroy the bond. Reinforcing steel reduced in section shall not be used. After any substantial delay in the work, previously placed reinforcing steel for future bonding shall be inspected and cleaned. Reinforcing steel shall not be bent or straightened in a manner injurious to the steel or concrete. Bars with kinks or bends not shown in the drawings shall not be placed. The use of heat to bend or straighten reinforcing steel shall not be permitted. Bars shall be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, the resulting arrangement of bars including additional bars necessary to meet structural requirements shall be approved before concrete is placed. In slabs, beams and girders, reinforcing steel shall not be spliced at points of maximum stress unless otherwise indicated. Unless otherwise shown in the drawings, laps or splices shall be 40 times the reinforcing bar diameter.

2. The nominal dimensions and unit weights of bars shall be in accordance with the following table:

Nominal Diameter (mm)	Nominal Perimeter (mm)	Nominal Sectional Area (mm^2)	Unit Weight (kg/m)
6	18.8	28.27	0.222
10	31.4	78.54	0.616
12	37.7	113.10	0.888
16	50.3	201.10	1.579
20	62.8	314.20	2.466
25	78.5	490.90	3.854
28	88.0	615.70	4.833
32	100.5	804.20	6.313
36	113.1	1017.60	7.991
40	125.7	1256.60	9.864
50	157.1	1963.50	15.413

3. Welding of reinforcing bars shall only be permitted where shown; a welding shown shall be performed in accordance with AWS D 12.1.

4. Exposed reinforcement bars, dowels and plates intended for bonding with future extensions shall be protected from corrosion.

5. Supports shall be provided in conformance with ACI 315 and ACI 318, unless otherwise indicated or specified.

6. Concrete Protection for Reinforcement
    1. The minimum concrete cover of reinforcement shall be as shown below unless otherwise indicated in the drawings.
    2. Tolerance for Concrete Cover of Reinforcing Steel other than Tendons.

Minimum Cover	Maximum Variation
7.5 cm or more (marine structures and concrete cast against and permanently exposed to earth)	9 mm
less than 7.5 cm (other structures)	6 mm

CLASSES OF CONCRETE AND USAGE

(a) Strength Requirement:

(i) Concrete of the various classes unless specified in other Sections or indicated on the Drawings or directed by the Engineer shall be proportioned and mixed to achieve the following strengths:

Class	Specified Compressive Strength - 28 days	
	fc' = MPa	fc' = psi
A	34.5	5,000
B1	27.6	4,000
B2	24.1	3,500
C	20.7	3,000
D	17.2	2,500
E	41.4	6,000

(ii) In addition to the above, the maximum permissible water-cement ratio by weight shall not be greater than 0.55 unless otherwise permitted by the Engineer.

PROPORTIONING OF CONCRETE MIXES

1. Trial design batches and testing to meet requirements of the classes of concrete specified shall be the responsibility of the Contractor. Tests for slump, unit weight, and air content shall be performed in the field under the presence of the Engineer.

2. Concrete Proportioning: Samples of approved aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregates shall be representative of those proposed for the Project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixes having proportions, consistencies and air content suitable for the work shall be made based on ACI Standard 211.1 using at least three different water-cement ratios which will produce a range of strength encompassing those required for the work. Trial mixes shall be designed for maximum permitted slump and air content. The temperature of concrete in each trial batch shall be reported. For each watercement ratio at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 39. From these test results, a curve shall be plotted showing the relationship between water-cement ratio and strength.

3. Average Strength: For each portion of the structure, proportions shall be selected so that the maximum permitted water-cement ratio is not exceeded and so as to produce an average strength to exceed the specified strength fc' by the amount indicated below. Where production facility has a standard deviation record determined in accordance with ACI 214, based on 30 consecutive strength tests of similar mixture proportions as proposed it shall be used in selecting average strength.

   The average strength used as the basis for selecting proportions shall exceed the specified strength fc' by at least:

i. 2.94 MPa if standard deviation is less than 1.96 MPa
ii. 3.92 MPa if standard deviation is 1.96 to 2.94 MPa
iii. 4.90 MPa if standard deviation is 2.94 to 3.92 MPa
iv. 5.88 MPa if standard deviation is 3.92 to 4.90 MPa
v. If a standard deviation record is not available, proportions shall be selected to produce an average strength of at least 6.86 MPa greater than the specified strength.

4. Corrective additions to remedy deficiencies in aggregate gradation shall be used only on written approval of the Engineer.

5. Slump: Tests shall be made in conformance with ASTM C 143, and unless otherwise specified by the Engineer, slump shall be within the following limits:

Structural Element	Slump for Vibrated Concrete	
	Minimum	Maximum
Pavement Concrete	25 mm	50 mm
Precast Concrete	50 mm	70 mm
Lean Concrete	100 mm	200 mm
All other Concrete	50 mm	90 mm

Sampling: Provide suitable facilities and labor for obtaining representative samples of concrete for the Contractor's quality control and the Engineer's quality assurance testing. All necessary platforms, tools and equipment for obtaining samples shall be furnished by the Contractor.

MIXING CONCRETE

1. General
   (a) Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.
   (b) All concrete shall be mixed in mechanically operated mixers. Mixing plant and equipment for transporting and placing concrete shall be arranged with an ample auxiliary installation to provide a minimum supply of concrete in case of breakdown of machinery or in case the normal supply of concrete is disrupted. The auxiliary supply of concrete shall be sufficient to complete the casting of a section up to a construction joint that will meet the approval of the Engineer.

   (c) Equipment having components made of aluminum or magnesium alloys, which would be in contact with plastic concrete during

mixing, transporting or pumping of Portland cement concrete, shall not be used.

(d) Concrete mixers shall be equipped with adequate water storage and a device for accurately measuring and automatically controlling the amount of water used.

(e) Materials shall be measured by weighing. The apparatus provided forweighing the aggregates and cement shall be suitably designed and constructed for this purpose. The accuracy of all weighing devices except that for water shall be such that successive quantities can be measured to within one percent of the desired amounts. The water measuring device shall be accurate to plus or minus 0.5 percent. All measuring devices shall be subject to the approval of the Engineer. Scales and measuring devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.

(f) Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the entire plant is running, the scale reading at cut-off shall not vary from the weight designated by the Engineer by more than one percent for cement, 1-½ percent for any size of aggregate, or one percent for the total aggregate in any batch.

(g) Manual mixing of concrete shall not be permitted unless approved by the Engineer.

2. Mixing Concrete At Site

(a) Concrete mixers may be of the revolving drum or the revolving blade type and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. The pick-up and throw-over blades of mixers shall be restored or replaced when any part or section is worn 20 mm or more below the original height of the manufacturer's design. Mixers and agitators which have an accumulation of hard concrete or mortar shall not be used.

(b) When bulk cement is used and the volume of the batch is 0.5 m3 or more, the scale and weigh hopper for Portland cement shall be separate and distinct from the aggregate hopper or hoppers. The discharge mechanism of the bulk cement weigh hopper shall be interlocked against opening before the full amount of cement is in the hopper. The discharging mechanism shall be interlocked

against opening when the amount of cement in the hopper is underweight by more than one percent or overweight by more than 3 percent of the amount specified.

(c) When the aggregates contain more water than the quantity necessary to produce a saturated surface dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.

(d) The batch shall be so charged into the mixer that some water enter in advance of cement and aggregates. All water shall be in the drum by the end of the first quarter of the specified mixing time.

(e) Cement shall be batched and charged into the mixer by such means that it will not result in loss of cement due to the effect of wind, or in accumulation of cement on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

(f) All concrete shall be mixed for a period of not less than 3 minutes after all materials, including water, are in the mixer. During the period of mixing, the mixer shall operate at the speed for which it has been designed.

(g) Mixers shall be operated with an automatic timing device that can be locked by the Engineer. The time device and discharge mechanism shall be so interlocked that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.

(h) The first batch of concrete materials placed in the mixer shall contain a sufficient excess of cement, sand, and water to coat the inside of the drum without reducing the required mortar content of the mix. When mixing is to cease for a period of one hour or more, the mixer shall be thoroughly cleaned.

3. Mixing Concrete In Trucks

(a) Truck mixers, unless otherwise authorized by the Engineer, shall be of the revolving drum type, watertight, and so constructed that the concrete can be mixed to insure a uniform distribution of materials throughout the mass. All solid materials for the concrete shall be accurately measured and charged into the drum at the proportioning plant. Except as subsequently provided, the truck mixer shall be equipped with a device by which the quantity of water

added can be readily verified. The mixing water may be added directly to the batch, in which case a tank is not required. Truck mixers may be required to be provided with a means by which the mixing time can be readily verified by the Engineer.

(b) The maximum size of batch in truck mixers shall not exceed the minimum rated capacity of the mixer as stated by the manufacture and stamped in metal on the mixer. Truck mixing shall, unless otherwise directed, be continued for not less than 100 revolutions after all ingredients, including water, are in the drum. The mixing speed shall not be less than 4 rpm, nor more than 6 rpm.

(c) Mixing shall begin within 30 minutes after the cement has been added either to the water or aggregate, but when cement is charged into a mixer drum containing water or surface-wet aggregate and when the temperature is above 32 °C, this limit shall be reduced to 15 minutes. The limitation in time between the introduction of the cement to the aggregate and the beginning of the mixing may be waived when, in the judgment of the Engineer, the aggregate is sufficiently free from moisture, so that there will be no harmful effects on the cement.

(d) When a truck mixer is used for transportation, the mixing time in stationary mixer may be reduced to 30 seconds and the mixing completed in a truck mixer. The mixing time in truck mixer shall be as specified for truck mixing.

4. JOINTS

(a) No reinforcement, corner protection angles or other fixed metal items shall be run continuously through joints containing expansion-joint filler, through crack-control joints in slabs on grade and vertical surfaces.

(b) Preformed Expansion Joint Filler

(i) Joints with Joint Sealant: At expansion joints in concrete slabs to be exposed, and at other joints indicated to receive joint sealant, preformed expansion-joint filler strips shall be installed at the proper level below the elevation with a slightly tapered, dressed-and-oiled wood strip temporarily secured to the top thereof to form a groove. When surface dry, the groove shall be cleaned of foreign matter, loose particles, and concrete protrusions, then filled flush approximately with joint sealant so as to be slightly concave after drying.

(ii) Finish of concrete at joints: Edges of exposed concrete slabs along expansion joints shall be neatly finished with a slightly rounded edging tool.

(iii) Construction Joints:

Unless otherwise specified herein, all construction joints shall be subject to approval of the Engineer. Concrete shall be placed continuously so that the unit will be monolithic in construction. Fresh concrete may be place against adjoining units, provided the set concrete is sufficiently hard not to be injured thereby. Joints not indicated shall be made and located in a manner not to impair strength and appearance of the structure. Placement of concrete shall be at such rate that the surface of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Lifts shall terminate at such levels as are indicated or as to conform with structural requirements as directed. If horizontal construction joints are required, a strip of 25 mm square-edged lumber, beveled to facilitate removal shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 25 mm above the underside of the strip. The strip shall be removed one hour after the concrete has been placed. Any irregularities in the joint line shall be leveled off with a wood float, and all laitance removed. Prior to placing additional concrete, horizontal construction joints shall be prepared as specified in sub-section 3.2.14, "Bonding." Construction Joint which is not indicated in the Drawings shall be located as to least affect the strength of the structure. Such locations will be pointed out by the Engineer.

5. PLACING CONCRETE

(a) Handling Concrete: Concrete shall be handled from mixers and transported to place for final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredients until the approved unit of work is completed. Placing will not be permitted when the sun, heat, wind or limitations of facilities furnished by the Contractor prevent proper finishing and curing of the concrete. Concrete shall be placed in the forms, as close as possible in final position, in uniform, approximately horizontal layers not over 40 cm deep. Forms splashed with concrete and reinforcement splashed with concrete or form coating shall be cleaned in advance of placing subsequent lifts. Concrete shall not be allowed to drop freely more than 1.5 m in unexposed work nor more than 1.0 m in exposed work; where greater drops are required, tremie or other approved means shall be employed. The discharge of the tremie shall be controlled so that the concrete may

be effectively compacted into horizontal layers not more than 40 cm thick, and the spacing of the tremies shall be such that segregation does not occur. Concrete to be overlayed shall be screeded to the proper level to avoid excessive shimming or grouting. Conduits and pipes shall not be embedded in concrete unless specifically indicated.

(b) Time Interval between Mixing and Placing: Concrete mixed in stationary mixers and transported by non-agitating equipment shall be placed in the forms within 30 minutes from the time ingredients are charged into the mixing drum. Concrete transported in truck mixers or truck agitators shall be delivered to the site of work, discharged in the forms within 45 minutes from the time ingredients are discharged into the mixing drum. Concrete shall be placed in the forms within 15 minutes after discharged from the mixer at the jobsite.

(c) Conveying Concrete by Chute, Conveyor or Pump: Concrete may be conveyed by chute, conveyor, or pump if approved in writing. In requesting approval, the Contractor shall submit his entire plan of operation from the time of discharge of concrete from the mixer to final placement in the forms, and the steps to be taken to prevent the formation of cold joints in case the transporting of concrete by chute, conveyor or pump is disrupted. Conveyors and pumps shall be capable of expeditiously placing concrete at the rate most advantageous to good workmanship. Approval will not be given for chutes or conveyors requiring changes in the concrete materials or design mix for efficient operation.

6. COMPACTION

(a) Immediately after placing, each layer of concrete shall be completed by internal concrete vibrators supplemented by hand-spading, rodding, and tamping. Tapping or other external vibration of forms will not be permitted unless specifically approved by the Engineer. Vibrators shall not be used to transport concrete inside the forms. Internal vibrators submerged in concrete shall maintain a speed of not less than 7,000 impulses per minute. The vibrating equipment shall at all times be adequate in number of units and power to properly consolidate all concrete.

(b) Spare units shall be on hand as necessary to insure such adequacy. The duration of vibrating equipment shall be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrator shall not be

inserted into the lower courses that have begun to set. Vibrator shall be applied vertically at uniformly spaced points not further apart than the visible effectiveness of the machine.

7. EPOXY BONDING COMPOUND
   (a) Before depositing new concrete on or against concrete that has set, the surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coatings, foreign matter and loose particles. Forms shall be re-tightened. The cleaned surfaces shall be moistened, but shall be without free water when concrete is placed.

8. FINISHES OF CONCRETE
   (a) Within 12 hours after the forms are removed, surface defects shall be remedied as specified herein. The Temperature of the concrete, ambient air and mortar during remedial work including curing shall be above 10 °C. Fine and loose material shall be removed. Honeycomb, aggregate pockets, voids over 13 mm in diameter, and holes left by the rods or bolts shall be cut out to solid concrete, reamed, thoroughly wetted, brush-coated with neat cement grout, and filled with mortar. Mortar shall be a stiff mix of one part Portland cement to not more than 2 parts fine aggregate passing the No. 16 mesh sieve, with a minimum amount of water. The color of the mortar shall match the adjoining concrete color. Mortar shall be thoroughly compacted in place. Holes passing entirely through walls shall be completely filled from the inside face by forcing mortar through the outside face. Holes which do not pass entirely through wall shall be packed full. Patchwork shall be finished flush and in the same plane as adjacent surfaces. Exposed patchwork shall be finished to match adjoining surfaces in texture and color. Patchwork shall be damp-cured for 72 hours. Dusting of finish surfaces with dry material or adding water to concrete surfaces will not be permitted.

9. CURING
   (a) Concrete shall be protected against moisture loss, rapid temperature changes, mechanical injury from rain or flowing water, for a minimum period of time given below:

Types A, B1 and B2	7 days
Types C and D	5 days

   (b) "Finishes of Concrete". Curing activities shall be started as soon as free water has disappeared from the surface of the concrete after

placing and finishing. Formed under-surfaces shall be moist cured with forms in place for the full curing period or, if forms are removed prior to the end of the curing period, by other approved means. Curing shall be accomplished by any of the following methods or combination thereof, as approved.

10. UNDER WATER CONCRETE

(a) Concrete placement under water, when unavoidable, shall be made in accordance with the following requirements and provided always with the Engineer's approval.

(b) Water cement ratio shall be within 50 percent.

(c) Weight of cement per one cubic meter shall be not less than 370 kg.

(d) Use of water reducing admixtures and/or admixtures that reduce concrete contamination by sea water shall be recommended.

(e) Slump shall be within the following limits:

Construction Method	Slump
Using tremie or concrete pump	Between 13 to 18 cm
Using bottom opening type box or buck	Between 10 to 13 cm

(f) Coverage of reinforcement shall be 10 cm or more.

ITEM 2.04: SUPPLY AND INSTALL 500MMX1500MM V-TYPE AND 700MM X 350MM X1000MM CYLINDRICAL RUBBER DOCK FENDER INCLUDING ACCESSORIES

SCOPE OF WORKS

The work shall include furnishing of all labor, materials, and equipment necessary to complete the supply and installation of a rubber dock fender (700mm x 350mm x 1000mm) cylindrical type, including accessories and 500mmx1500mm V Type and in accordance with the approved manufacturer's recommendations and shop drawings and as directed by the PPA Engineer.

The contractor shall submit for approval of the PPA Engineer, brochures/manuals of the RDFs proposed to be installed, which shall be reviewed by the PPA Engineer. If found satisfactory and in accordance with the standard requirements of PPA, approval shall be given, subject, however, to the standard tests that the proposed RDF should pass prior to their delivery at the site.

Upon delivery at the site but before installation, the RDFs shall be inspected by the PPA Engineer to determine their physical conformance with PPA requirements as to dimensions, type, make, markings, and acceptance tolerances. RDFs not conforming to PPA requirements shall be rejected and replaced.

The Contractor shall guarantee the fenders against any defects that are attributable to faulty design and manufacture and shall also guarantee the performance of the fenders under normal working conditions. The guarantee shall be for a minimum period of 12 months from the date of the issuance of the Taking-Over Certificate of the Works. During the period of guarantee, repairs and replacement of defective fender units and/or material shall be carried out by the Contractor at his own expense.

MATERIAL REQUIREMENT AND EXECUTION

TESTING PROCEDURES AND REQUIREMENTS

All RDFs shall be subjected to performance testing.

Mandatory testing for all items and be subjected to a 100% test.

It shall pass the required energy absorption and reaction force at a certain deflection as indicated in the approved plans/drawings.

The standard performance testing methodology shall be Method B, to wit:

o Fender temperature shall be stabilized at 23 degrees plus or minus 5 degrees centigrade for at least 24hours before compression testing.

o Break-in of fender by deflecting 3 times to the rated deflection.

o Remove load from the RDF and allow recovery for a minimum of 1 hour.

o Deflect RDF at a speed of 2-8 cm/min once to the rated deflection.

The testing apparatus shall be calibrated and certified within plus or minus 1% in accordance with ISO or equivalent JIS or ASTM requirements. Calibration shall be traceable to a national/international standard and shall be performed annually by an accredited third-party organization. The RDF performance testing center shall be subjected to accreditation by PPA and notation and/or certification by DPWH BRS prior to acceptance.

All RDF items/units shall be clearly numbered and marked. Each fender shall have the following mark:

o Fender type and manufacturer's name or trademark.

o Production serial number

o Date manufacture or its abbreviation

o Main dimensions

o Project identification follows:

- Name of Port/Project
- Year Supplied

All fenders of each type shall be inspected for compliance with specified dimensions and the same shall be certified by respective PMO-ESD officers/engineers to be structurally sound and devoid of any sign of flaw or defect inimical to its use.

The acceptance tolerance shall be based on the following:

o Fender Dimension:
- Length: -2% to +4%
- Width: -2% to +4%
- Height: -2% to +4%
- Thickness: -2% to +4%

o Anchor Bolt Holes in Fender:
- Diameter of the Hole: +2.0mm
- Pitch of the Hole: +4.0mm

o Acceptance tolerance for all fenders supplied as follows:
- E = Energy Absorption, E ≥ Specified E but not less than 10% of the specified E
- R = Reaction Force, E ≤ Specified R but not more than 10% of the specified R

ITEM 2.05: SUPPLY AND INSTALL W150X X37.1 X6M STEEL RAMP PROTECTION

GENERAL

General Requirements contain provisions and requirements essential to these specifications, and apply to this Section, whether or not referred to herein

SCOPE OF WORK

The work shall include the furnishing of all labor, materials, equipment, and other incidentals necessary to complete the fabrication & installation of steel I-beam & mild steel plate for top and corner ramp protection in accordance with the sizes, distances, and design shown on the Drawings and as directed by the PPA Engineer.

SUBMITTAL

1. Before placing orders for materials for the steel and metal works, the Contractor shall submit to the Engineer for approval shop drawings for all steel work. All project shop drawings shall show the dimensions of all parts, method of construction, bolts, welding, sectional areas, and other details.

2. No materials shall be ordered nor fabrication commenced until the shop drawings are approved by the Engineer.

STORAGE OF MATERIALS

Structural materials, either plain or fabricated, shall be stored above the ground upon platforms, skids, or other supports. Materials shall be kept free from dirt, grease, and other foreign matter, and shall be protected horn corrosion.

MATERIAL REQUIREMENTS

Materials to be used shall be:

- Steel I-beam (W150X37.10), A36
- MS (Mild Steel) Plate, A36

All structural steel material as per ASTM A36. All structural steel materials are required to have a Mill Certificate and Physical Test (Dimensions) for all units. Quality Test for Chemical Composition and Mechanical Properties. Tests will be made for every 10,000 kg or fraction thereof.

All welding works as per ANSI/AWS D1.1 (Structural Welding Code – Steel). Tests will be made by destructive and non-destructive testing for one (1) per lot.

All welding works shall be done by experienced/qualified welders. Welders must be certified by TESDA. The welding machine to be used shall be capable of providing the required current to each welding point without appreciable fluctuations.

Surfaces to be welded shall be free from loose scale, slug, rust, grease, paint, and other foreign material except that mill scale which withstands vigorous wire brushing may

remain. Joint surfaces shall be free from fins and tears. Preparation of edges by gas cutting shall, wherever practicable, be done by a mechanically guided torch.

1. Unless specified herein, all steel structures and metals shall conform to the requirements of" Steel and Metal Works." Connections where details are not specified or indicated herein shall be designed in accordance with the American Institute of Steel Construction
(AISC), Manual of Steel Construction, latest edition.

2. Structural steel works consisting of channels, gusset plates, and other structural steel shapes shall be as indicated on drawings and shall be structural carbon steel conforming to ASTM A36. Shapes shall be as given in the AISC, Manual of Steel Construction.

4. Electrodes for arc welding shall be E70 series conforming to the American Welding Society
Specifications.

5. Tests are required under the ASTM Standards for steel to be used in the Works and shall be carried out in the presence of the Engineer, and at least four (4) days' notice must be given to him of two dates proposed for such tests. Four (4) calendar days' notice on which fabricated steelwork will be ready for inspection in the Contractor's yard.

EXECUTION

QUALIFICATION

Qualification of steel fabricators, erectors, and welders shall comply with the requirements.
FABRICATION REQUIREMENTS

1. Workmanship

Fabrication shall be performed within the permissible tolerance by the approved fabricator. All workmanship shall be of the best quality with respect to internationally recognized standards
standards of practice.

2. Cutting

Low-carbon structural steel may be cut by a machine-guided torch instead of by shears or a saw. Harmful notches, burrs, Irregularities, etc., shall not be developed at the cut surface.

3. Contact Faces

Contact surfaces between bases or other elements bearing directly upon bearing plates shall be ground or milled as necessary for Rill effective bearing. Edges for welding shall likewise be properly prepared.